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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,870	02/14/2002	Naoki Okino	219593US3CONT	6350
22850	7590	01/24/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ROSSI, JESSICA	
			ART UNIT	PAPER NUMBER
			1733	
DATE MAILED: 01/24/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/073,870

Applicant(s)

OKINO ET AL.

Examiner

Jessica L. Rossi

Art Unit

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— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/27/04, RCE.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-35 is/are pending in the application.
- 4a) Of the above claim(s) 25-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Machine assisted translation.

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DETAILED ACTION

RCE

1. The request filed on 12/27/04 for a RCE under 37 CFR 1.114 based on parent Application No. 10/073,870 is acceptable and a RCE has been established. An action on the RCE follows.

Response to Amendment

2. This action is in response to the amendment dated 12/27/04. Claims 1-12 were cancelled. Claims 13-35 are pending.

3. It is noted that the original claims were rejected in the previous office action using US 4708762 to Lenhardt as the primary reference. This reference is not being applied as a primary reference to reject the new claims because although auxiliary suction conveyors 70a and 70b, which are located in both the first and second stages 2a and 2b, move the panes back and forth between the stages by driving the suction means associated with the conveyors (i.e. suction cups, suction belts), the conveyors themselves remain stationary at all times; therefore, Lenhardt fails to teach or suggest pulling the panes to stage 2b by moving the conveyors toward the first stage, affixing the conveyors to the panes, and pulling the conveyors into the second stage.

Election/Restrictions

4. Newly submitted claims 25-32 and 33-35 are directed to inventions that are independent or distinct from the invention originally claimed for the following reasons:

1) Claims 25-32 are directed to a Species that is mutually exclusive from that examined in the previous office action because original claims 1-6 (see claims 1 and 6) were drawn to supporting the first and second glass sheets by sucking portions on the first and second glass

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sheets, as shown in Figure 2, while new claims 25-32 are drawn to supporting the second glass sheet using rollers instead of suction, as shown in Figure 4. Applicant is also invited to read p. 18 of the specification.

2) Claims 33-35 are directed a system/apparatus that can be used to practice another and materially different process such as one for preparing a unit comprising first and second sheets that are not glass (i.e. metal, plastic).

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 25-35 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 13-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With respect to claim 13, the specification does not have support for an actuator driven sled, as set forth in line 8. It appears that Applicant is referring to the actuator driven frame 30 (Figure 1 and p. 16, lines 12-20) and therefore should replace "sled" with --frame--.

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Regarding claim 15, the specification does not have support for the rollers extending beyond the faces of the pair of suction boxes facing the glass sheets. According to the specification (p. 14, lines 4-14 and Figure 2), the rollers extend from upper and lower sides of the suction boxes (faces of suction boxes that do not face the glass sheets). Applicant should amend the claim accordingly.

Regarding claim 21, the specification does not have support for applying the resin to a first edge of at least one of the first and second glass sheets. According to the specification, the resin is applied between the edges of the first and second glass sheets (p. 22-23). Therefore, Applicant should amend lines 2, 4, 7 and 9 of the claim accordingly (for example, amend line 2 to state --applying resin between first vertical edges of the first glass sheet and second glass sheet inside the fixed distance gap;--).

Regarding claim 23, the specification only teaches the fixed distance gap in the second stage being equal to the fixed distance gap in the first stage (p. 8-9) and therefore it does not have support for the fixed distance gap in the second stage being "substantially equal" to the fixed distance gap in the first stage.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 13-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Regarding claim 13, it recites the limitation "the first and second glass plates" in line 13. There is insufficient antecedent basis for this limitation in the claim. It is suggested to change "plates" to --sheets--.

Regarding claim 16, it recites the limitation "the half" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is suggested to change "the" to --a--.

Regarding claim 17, it recites the limitation "the second suction box" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is suggested to insert --single-- after "second".

Regarding claim 17, it is unclear what Applicant means by "the first single suction box and the second single suction box have a length greater than a width and are positioned such that a length dimension...". Do the first and second single suction boxes combine to have a length? The width is a width with respect to what? Is length different from a length dimension? Applicant is asked to clarify. It is suggested to amend the claim to state --wherein the first single suction box and the second single suction box each have a length greater than its width and are positioned such that the length...--.

Regarding claim 19, it recites the limitation "the half" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is suggested to change "the" to --a--.

Regarding claim 20, it is unclear what Applicant means by "the first single suction box and the second single suction box have a length greater than a width and are positioned such that a length dimension...". Do the first and second single suction boxes combine to have a length? The width is a width with respect to what? Is length different from a length dimension? Applicant is asked to clarify. It is suggested to amend the claim to state --wherein the first

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single suction box and the second single suction box each have a length greater than its width and are positioned such that the length...--.

Regarding claim 22, it is unclear what Applicant means by "a second fixed distance in the gap". Applicant is asked to clarify. It is suggested to change this to --a second fixed distance gap--.

Regarding claim 23, it is unclear what Applicant intends by this claim since the specification only teaches the fixed distance gap in the second stage being equal to the fixed distance gap in the first stage (p. 8-9). Applicant is asked to clarify. It is suggested to delete claim 23 and amend claim 22 to state --using suction force to maintain the fixed distance gap between the first glass sheet and the second glass sheet...--.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 13 and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshitaka et al. (JP 10-158041; provided in IDS; abstract and machine assisted translation).

With respect to claim 13, Yoshitaka teaches a method for preparing a double glazing unit by positioning a first glass sheet 31a and a second glass sheet 31b into a first stage movement apparatus (designated by table 4a and conveyor 22a), maintaining a fixed distance gap between the sheets in the first stage with a holder 25 using suction force, moving the glass sheets to a second stage movement apparatus (designated by table 4b and conveyor 22b) using a first driven

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guide 22a located in the first stage, a second driven guide 22b located in the second stage, and a suction chuck 25 located on a actuator driven sled/rail 24, and maintaining with suction the fixed distance gap while the sheets are moved. The reference teaches the moving step including pulling the glass sheets to the second stage by moving the suction chuck toward the first stage, affixing the suction chuck to the sheets via suction, and pulling the suction chuck into the second stage (Figure 4; sections [0019-0026] and [0036] of machine assisted translation).

Please note that present claim language does not exclude the "holder" and "suction chuck" being one and the same.

Regarding claims 21-24, the reference teaches such (Figure 4; section [0034] of machine assisted translation).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

13. Claims 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshitaka et al. as applied to claim 13 above and further in view of the collective teachings of Lenhardt (US 5051145) and Lenhardt (US 4708762).

Regarding claims 14 and 18, Yoshitaka is silent as to these limitations. It would have been obvious to the skilled artisan to maintain the fixed distance gap between the glass sheets of

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Yoshitaka by replacing the tables 4a and 4b with pairs of suction boxes positioned symmetrically with respect to each other on the faces of both the first and second glass sheets because it is known in the art to position multiple suction boxes on the face of a glass sheet to maintain a fixed distance gap between glass sheets as they move between first and second stages 2a and 2b, as taught by Lenhardt '145 (teaches multiple suction boxes 101 on the face of a glass sheet; Figure 7; column 13, lines 39-60), and it is also known in the art to position a suction box on the faces of both the first and second glass sheets to maintain a fixed distance gap between them as they move between first and second stages 2a and 2b, as taught by Lenhardt '762 (teaches suction boxes 70a and 70b; Figure 3; column 8, lines 4-10; column 11, lines 6-12), wherein only the expected results of maintaining the fixed distance gap would have been achieved.

Regarding claim 15, selection of a particular configuration for the boxes would have been within purview of the skilled artisan especially since both Lenhardt references are not concerned with a particular configuration.

Regarding claims 16 and 19, both Lenhardt references teach such (see Figure 1 in '145 and Figure 11 in '762).

Allowable Subject Matter

14. Claims 17 and 20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

15. Applicant's arguments with respect to claims 13-24 have been considered but are moot in view of the new ground(s) of rejection.


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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Jessica L. Rossi** whose telephone number is **571-272-1223**. The examiner can normally be reached on M-F (8:00-5:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Blaine R. Copenheaver can be reached on 571-272-1156. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jessica L. Rossi
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Notice of References Cited	Application/Control No. 10/073,870		Applicant(s)/Patent Under Reexamination OKINO ET AL.	
	Examiner Jessica L. Rossi		Art Unit 1733	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-5,051,145	09-1991	Lenhardt, Karl	156/99
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Machine Assisted Translation of JP 10-158041

NOTICES

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the method and equipment which really fabricate the detailed spacer made of resin among two or more glass plates, and manufacture multiple glass about the manufacture method of multiple glass, and equipment.

[0002]

[Description of the Prior Art] The multiple glass known by the current general target makes the glass plate of at least two sheets counter through a spacer, and after it sticks the glass plate and spacer in a butyl system sealant and intercepts a hollow layer and the open air, it is manufactured by the method of sealing the opening which consisted of the insides and spacer peripheries of the glass plate which has countered with the room-temperature-setting mold sealing material represented with a polysulfide system or a silicone system. Usually, after a spacer fills up with a dry material the thing which connected each edge by the corner key and was assembled to the frame after having the shape of hollow made from aluminum, being beforehand cut according to the magnitude of a glass plate and filling up the centrum with a dry material, or a centrum, it carries out bending in each corner section, and uses what joined the edge together by the connection key and was assembled to the frame.

[0003] Apart from the double stratification production process of a glass plate, there are many complicated production processes, such as cutting of a spacer, dry material restoration, and a spacer assembly, and the manufacturing process of the multiple glass using such a metal spacer takes many helps. Moreover, at a sealing material's sealing production process, since a sealing material is a room-temperature-setting mold, it soils with the sealing material Rhine and whose sealing device are not hardened, and the yield of a product is reduced. Furthermore, it cannot ship until a sealing material hardens, but a vast regimen location is required. Moreover, although aluminum is used for a spacer in many cases, the portion with which the spacer made from aluminum and the glass plate are in contact serves as a heat-conduction point, and there is also a problem on which it reduces adiathermic [of multiple glass].

[0004] Then, the multiple glass using the spacer made of resin is proposed instead of the metal spacer. For example, the method of fabricating to homogeneity the material which uses isobutylene isoprene rubber as the base on a glass plate is indicated by JP,61-64415,A. Since according to this method the laminating of the glass plate of one more sheet was carried out and it has double-stratified after providing one side of a glass plate with a resin material and forming a spacer, a complicated activity [at a corner like the above-mentioned metal spacer] can be reduced. Moreover, since the opening which consisted of the insides and spacer peripheries of the glass plate which has countered is sealed with the above-mentioned room-temperature-setting mold sealing material after double-stratifying, the adiathermic fall of multiple glass can be controlled.

[0005]

[Problem(s) to be Solved by the Invention] By the way, according to the method of JP,61-64415,A, a series of spacer assembly production processes can be skipped among the manufacturing processes of conventional multiple glass. However, the double stratification production process of a glass plate, the press production process, and a sealing material's sealing production process are still required. Moreover, there is also a problem from which dispersion in the press pressure in a press production

process turns into dispersion in the thickness of a product.

[0006] So, the method of carrying out direct extrusion of the rigid resin material which scoured the dry material, and fabricating it between the glass plates of two sheets which open a predetermined gap up and down and are conveyed horizontally, is indicated by JP,7-17748,A. According to this method, since the above-mentioned double stratification production process and a sealing material's sealing production process can be skipped, a manufacturing process can be simplified.

[0007] After really fabricating a resin material by this method, conveying a glass plate in the direction of the side of a lot by one side, 90 degrees of glass plates are rotated and a resin material is made to already unite with the side of a lot. Therefore, the joint of a spacer becomes a total of four places of each corner section.

[0008] Multiple glass demonstrates the adiabatic efficiency and the dew condensation prevention effect by sealing the hollow layer between the glass plates of two sheets from the outside. Therefore, the precision of this seal influences the engine performance of multiple glass greatly. Therefore, there is fear of the degradation of multiple glass in some which many joints produce like the method of JP,7-17748,A. And in order to secure the engine performance of multiple glass, sufficient joint processing is required, and the part production process increases.

[0009] Furthermore, if a resin material is extruded in 1 more set of sides after extruding a resin material in 1 set of sides, the spacer already fabricated by 1 set of first sides will bar the fabrication operation to 1 more set of sides. And saying [that there are four parts which become this hindrance] makes a routing make it complicated so much.

[0010] In addition, by the method of JP,7-17748,A, after adhesives applying to glass, a resin material is extruded, but in order that the glass plate gap holder which secures the gap of the glass plate of two sheets to the adhesives spreading section may contact, adhesive strength of a glass plate and a spacer cannot be discovered enough, but there is a possibility that air-space inside dew condensation of multiple glass may occur at an early stage.

[0011] Therefore, the purpose of this invention solves the problem of the conventional technology in manufacture of multiple glass, and is to offer multiple glass excellent in various properties, such as adiabatic and dew condensation tightness, cheaply and simple.

[0012]

[Means for Solving the Problem] This invention **** two or more glass plates so that a hollow layer may be formed between them. Carrying out relative displacement of a die which has a predetermined delivery configuration and extrudes a resin material, and the periphery section of two or more glass plates in a manufacture method of multiple glass which extrudes a resin material from a die in the periphery section between glass plates which counter, and really fabricates a spacer made of resin. Two or more glass plates are held in the direction of a vertical so that migration of said two or more glass plates may become coincidence at the same speed as the respectively same direction. Migration of a glass plate and a die, respectively so that each migration direction of said glass plate and a die may intersect perpendicularly mutually as migration to an one direction. The periphery section between glass plates which counter while carrying out relative displacement of a die and the glass plate so that another side may be stopped, moving one side and making both migration change for every side of a glass plate is provided with a manufacture method of multiple glass characterized by extruding a resin material.

[0013] Moreover, a die which this invention has a predetermined delivery configuration and extrudes a resin material, A maintenance means to **** two or more glass plates with a predetermined gap so that a hollow layer may be formed between them, It has a migration means to which relative displacement of said die and the periphery section of two or more glass plates is carried out. In a manufacturing installation of multiple glass which really fabricates a spacer made of resin in the periphery section between glass plates which extrude a resin material and counter from a die while carrying out relative displacement of a die and the periphery section of two or more glass plates Said maintenance means is what is held in the direction of a vertical movable to coincidence at the same speed as the direction where two or more glass plates are the same respectively. Said migration means offers a manufacturing installation of multiple glass characterized by consisting of the 1st migration means to which a die is moved and the 2nd migration means which moves a glass plate made movable to an one direction, respectively so that a die and a glass plate may intersect perpendicularly mutually.

[0014]

[Embodiment of the Invention] Below, this invention is further explained at details based on a drawing. The outline side elevation in which drawing 1 shows an example of the manufacturing installation of the multiple glass of this invention, and drawing 2 are the outline front view. A die 11 is attached in the 1st migration means 1 which is equipped with a linear rail and made movable with a drive motor etc., and moves up and down in the direction of a vertical. A die 11 extrudes a resin material from the delivery which has a predetermined opening cross-section configuration for fabricating a spacer, and extrudes the extruder 12 connected through the swivel joint, and the resin material supplied from the resin passage pipe 13 in the periphery section between fields which the glass plate of two sheets counters in a predetermined cross-section configuration. In addition, gases and heat insulation gas, such as dry air, can also be blown by dryness between glass plate 31a which counters, and 31b from gas blowing-in opening prepared apart from the delivery.

[0015] Adsorption support of the field which counters and field of the opposite side is carried out with the adsorption pad 23, and glass plates 31a and 31b are held in the direction of a vertical on the glass plate maintenance base 21, maintaining both gap at a predetermined gap. the lower part is equipped with the wheel 22 and the glass plates 31a and 31b of two sheets are horizontally moved to this glass plate maintenance base 21 by the drive (for example, drive motor) and the glass plate maintenance base 21 which are not a drawing example, and the wheel 22 (2nd migration means).

[0016] Drawing 3 is drawing 1 for explaining the important section of a die, and the partial enlarged view of drawing 2, drawing 3 (a) is partial expansion front view, and drawing 3 (b) is the A-A line outline cross section of drawing 3 (a). A die 11 has the glass plate insertion section 15 and the delivery 16 which adjoined the main part section 14 of a die, and the main part section 14 of a die, and the glass plate presser-foot implement 17 formed in the inside side of the glass plate insertion section 15.

[0017] In the corner section of a glass plate, 90 degrees of main part sections 14 of a die rotate with a rotary motor etc. with the glass plate presser-foot implement 17 and a delivery 16. As for the axis of rotation at this time, it is desirable to carry out abbreviation coincidence with the medial axis of the resin passage 19 of the main part section 14 of a die. Supply of the stable resin material is attained by this.

[0018] In the above-mentioned example, the 2nd migration means is equipped with the glass plate maintenance base, and a glass plate is held here. In this case, when the thickness of a glass plate changes or the thickness of a hollow layer changes, it is necessary to prepare another glass plate maintenance base. Moreover, it is necessary to make it adjust or drive so that a die and a glass plate maintenance base interfere and may not suit in the lower side. Then, it is desirable to make the thing of a configuration of to make it synchronize with the drive of a conveyor and to make it move horizontally by the same motion as a motion of glass plate 31a into the 2nd migration means, carrying out adsorption maintenance of the glass plate 31b, while putting glass plate 31b on vertical table 4a and moving glass plate b horizontally by conveyor 22, as shown in drawing 4. In this case, the multiple glass of the hollow layer of desired thickness can be easily manufactured by controlling the gap to glass plate 31a of glass plate 31b which carried out adsorption maintenance.

[0019] Next, the equipment using the 2nd migration means which consists of this conveyor etc. explains the example of a production process which manufactures multiple glass (refer to drawing 4). First, it supports so that glass plate 31b may be put against table 4a which started in the direction of a vertical, and it lays on conveyor 22a. Subsequently, (b) which is made to move glass plate 31b by conveyor 22a, and positions glass plate 31b in a predetermined location by the drive of conveyor 22a in the location of a stopper 29. A stopper 29 is decided to be a predetermined location by inserting in the hole prepared for example, on table 4a. Moreover, when glass plate 31b arrives at the location of a stopper 29 by the sensor which senses a glass plate, a motion of conveyor 22a is stopped.

[0020] Next, (b) to which only predetermined distance retreats a cylinder while moving the maintenance frame 25 which runs the linear rail 24 top to the halt location of glass plate 31b, turning to glass plate 31b page the adsorption pad prepared in the maintenance frame 25 through the cylinder etc., advancing it and carrying out adsorption maintenance of the glass plate 31b. At this time, facilitation of an activity which removes a stopper 29 from the hole on table 4a in a subsequent production process can be attained by making a stopper 29 connect with the maintenance frame 25 with a bar.

[0021] Similarly, glass plate 31a is put against table 4a, it lays in conveyor 22a in support of the direction of a vertical, even a stopper 29 is moved, and it positions in the same location as glass plate 31b. In this way, the glass plates 31a and 31b of two sheets are held by conveyor 22a and table 4a, and

the maintenance frame 25, respectively, holding the retreated gap of a cylinder. Then, the glass plates 31a and 31b of two sheets are moved to the table 4b and conveyor 22b side, keeping the same the speed to which conveyor 22a is moved, and the speed to which the maintenance frame 25 moves the linear rail 24 top. And when the left part of the glass plate of drawing reaches even to a die 11, migration of glass plates 31a and 31b is suspended (Ha).

[0022] The die 11 is movable to the direction upper and lower sides of a vertical, and is standing by the gap of Tables 4a and 4b to the middle upper part of Tables 4a and 4b. A die 11 is dropped, inserting a delivery among glass plates 31a and 31b, and extruding a resin material between glass plate 31a and glass plate 31b from a delivery by dropping a die 11, (NI: the 1st step). In this way, spacer 3a is really fabricated between glass plate 31a in left part, and 31b. At this time, the delivery has turned to the upper part of drawing. A spacer can really be fabricated by controlling the passing speed of a die 11, and the amount of extrusion of a resin material, and making it align to homogeneity between glass plate 31a and 31b.

[0023] Migration of a die is suspended at the same time a die 11 arrives at the lower limit of glass plates 31a and 31b, and 90 degrees of dies are rotated counterclockwise. At this time, the overage of a resin material can be prevented by controlling the amount of the resin material extruded. While it specifically extruded with the die migration at the time of die rotation when a die 11 arrives at the lower limit of a glass plate and the alignment control method of an amount had fixed a setup of an extruder, the draining valve provided in a die 11 is changed from a delivery to an exhaust port, and it is attained by controlling the amount of extrusion from a delivery to a precision by pouring resin to an exhaust port side. Thereby, also in the corner section, a resin material can be supplied between glass plates at homogeneity.

[0024] A draining valve is changed from an exhaust port to a delivery at the same time rotation of a die 11 is completed, and resin is poured to a delivery side. Coincidence is made to carry out the alignment drive of the maintenance frame 9, and conveyor 2a and 2b, and glass plates 31a and 31b are turned and moved to the table 4a side from the table 4b side at the same speed (HO: the 2nd step). In this way, spacer 3b is really fabricated between glass plate 31a in the lower side, and 31b. A spacer can really be fabricated by controlling the passing speed of glass plates 31a and 31b, and the amount of extrusion of the resin material 33, and making it align like the above to homogeneity between glass plates.

[0025] Migration of glass plates 31a and 31b is suspended at the same time a die 11 arrives at the right end of glass plates 31a and 31b, and 90 degrees of dies 11 are rotated counterclockwise. The discharge quantity control under rotation is the same as that of the above. A die 11 is moved to rotation termination and coincidence up along with the right-hand side of glass plates 1a and 1b (HE: the 3rd step). At this time, it no longer interferes in migration of a die 11 by lengthening a bar and evacuating a stopper 29 before migration of a die 11. In this way, spacer 3c is really fabricated between glass plate 31a in the right-hand side, and 31b.

[0026] Migration of a die 11 is suspended at the same time a die 11 reaches the upper limit of a glass plate, and 90 degrees of dies 11 are rotated counterclockwise. The alignment drive of the maintenance frame 25 and the conveyors 22a and 22b is carried out at the same time rotation of a die is completed, and glass plates 31a and 31b are turned and moved to the table 4b side from the table 4a side at the same speed (TO: the 4th step). Migration of glass plates 31a and 31b is suspended at the same time a die 11 reaches the point at the left end of a glass plate ending [shaping], a draining valve is changed from a delivery to an exhaust port, and a die 11 returns to a position in readiness after suspending the extrusion from a delivery. A die 11 rotates to 270-degree clockwise rotation in a position in readiness, and returns to an early condition. (h) which cancels glass plate adsorption of an adsorption pad, conveys the **** glass fabricated from conveyor 22a to 22b, and carries out a deboard. In this way, the spacer made of resin is really fabricated by the periphery section perimeter between glass plate 31a and 31b.

[0027] In the above-mentioned production process, it is desirable by preparing two or more air flows in table 4a and 4b page to decrease friction of a between [glass plate 31a and a table] so that a location gap of glass plates 31a and 31b may not occur. Moreover, since regulating the location of both the glass plates by the stopper 29 can also prevent a location gap of glass plates 31a and 31b, it is desirable.

[0028] Moreover, although the field which counters mutually [the glass plate which counters], and the field of the opposite side are held in the above-mentioned example, the end face of not only this but a glass plate may be held. That is, also when holding the end face of a glass plate, it is because the relative displacement of a die and a glass plate is not barred. And both can also be used together about this

maintenance location. When the gap of a glass plate is chosen suitably and modification takes an example by the easy point, it is desirable to carry out adsorption maintenance of the field which counters, and the field of the opposite side.

[0029] Furthermore, it is desirable to blow desiccation gases, such as dry air and heat insulation gas, into a hollow layer at one shaping of a spacer and coincidence as mentioned above. As how to blow a desiccation gas, blowing the desiccation gas of a predetermined flow rate between glass plates is raised from desiccation gas blowing-in opening arranged at die 11 tip through the supply hose etc. from the desiccation gas feeder, for example. The air between glass plates is replaced with a desiccation gas, the hygroscopic moisture in the gas confined in multiple glass can be reduced, and dew condensation is prevented more by this. It can raise adiathermic [of multiple glass] by using gas with thermal conductivity lower than the air of dryness, and the so-called heat insulation gas as a desiccation gas. As heat insulation gas, although argon gas, krypton gas, 6 sulfur-fluoride gas, etc. are suitable, it is not limited to this.

[0030] More suitable bond strength is obtained by applying adhesives to the part where the spacer of a glass plate is really fabricated in this invention beforehand.

[0031] As a glass plate used by this invention, transparence organic glass boards further, for example like a polycarbonate or acrylic resin, such as laminated glass and tempered glass, can also be used as well as the inorganic glass plate of the usual veneer. Moreover, various functional coating called the so-called dark color ceramic color to the periphery section of a glass plate, such as coating, a heat ray reflex function, etc. for concealment, may be performed. Furthermore, if the glass plate of two or more more sheets is arranged maintaining a gap and two or more dies are used between the glass plates of two sheets, manufacture of the multiple glass using the glass plate of three or more sheets is also possible by forming a predetermined holder in the side where a resin material is finally extruded, and making it evacuate at the time of shaping to the side.

[0032] The relative-displacement procedure of a die and a glass plate is not limited to the above-mentioned example, either. For example, the above 1st - the 4th step sequencing may be changed, and relative displacement may be carried out in the order of a step of the 2nd, and 3, 4 and 1. Furthermore, the position in readiness of the first die can be carried out caudad, and it can also consider as the production process which is made to move a die towards the upper part from a lower part, and moves a die caudad towards the back from the upper part. In these cases, according to each order of a production process, the position in readiness of a die etc. is chosen suitably and determined.

[0033] Moreover, although the delivery of a die when having extruded the resin material turns to the travelling direction of the glass plate to a die and is carrying out the opening, also making it always suitable at right angles to the direction of the side of a glass plate may turn to the sense by which both were compounded. In this case, according to that sense, the extrusion outlet of a resin material is chosen suitably.

[0034] The migration means to which glass plates 31a and 31b are moved is not limited to the above-mentioned example, either. For example, glass plate 31b may be moved at the tip of a robot arm by the robot which has a fixing disc. In this case, one shaping of a spacer without a location gap of the glass plate of two sheets is realizable by making the robot teach that migration locus beforehand so that it may become the same motion as migration (based on a conveyor in the above-mentioned example) of glass plate 31a. Anyway, the glass plate of two sheets can be moved, maintaining between both at a predetermined gap using a predetermined control means by moving the glass plate of two sheets at the same speed as the same direction.

[0035] Although there will be especially no limit if a resin material is a material in which extrusion molding is possible, it is desirable to use a thermoplastics material. A thermoplastics material can make extrusion molding of a material possible easily only by applying heat, and a material only solidifies it immediately by neglect and thermolysis from the cooling solidification time amount of the material after extrusion molding being short. regimen time amount is unnecessary by this at a multiple glass manufacturing process -- becoming -- regimen space needlessness, short-term delivery correspondence, and handling -- it is because the effect of being easy is also acquired.

[0036] The example which actually manufactured multiple glass based on the example shown in above-mentioned drawing 4 below is shown. After making with a thickness of 3mm glass plate 31b hold on the maintenance frame 25 through an adsorption pad and making table 4a support with a thickness of 3mm

glass plate 31a similarly, the maintenance frame 25 was retreated, the gap was held to 12mm, and the glass plates 31a and 31b of two sheets were made to counter in parallel. Moving the passing speed of a die 11, and the bearer rate of the maintenance frame 25 and Conveyors 22a and 22b the speed for 15m/according to the above-mentioned shaping method While carrying out extrusion molding of the thermoplastics material which used isobutylene isoprene rubber as the principal component to the opening which consisted of insides of the opposite glass plate of two sheets from a die delivery The multiple glass which has a 12mm hollow layer was obtained by sealing the periphery section between opposite glass plates, blowing dry air from desiccation gas blowing-in opening.

[0037] In this way, it is JIS about the obtained multiple glass. When the durability test of the multiple glass specified to R3209 estimated, a dew-point is -35 degrees C or less, and obtained the good result.

[0038]

[Effect of the Invention] By according to this invention, fabricating a resin material by one to the opposed face periphery of the glass plate of at least two sheets held at the fixed gap, and manufacturing multiple glass to it The assembly production process of a spacer and a dry material packer from the conventional production process A spacer attachment production process, The press production process of a glass plate etc. can be skipped, reduction of large equipment, contraction of workspace, formation of ** people of an activity, and compaction of working hours can be performed, and the remarkable effect that multiple glass is offered by low cost is acquired.

[0039] Furthermore, a glass plate is held and fabricated at a predetermined gap at the time of shaping, since there are not the precision of the maintenance device being high and a press production process, dispersion in the thickness of multiple glass can be made small, and the effect that multiple glass with high thickness dimensional accuracy is offered is also acquired.

[0040] Moreover, it not only shortens the dew point depression time amount of multiple glass, but it can also raise adiathermic more by being able to shorten the dew point depression time amount of the multiple glass after shaping, and blowing the low heat insulation gas of thermal conductivity by dryness rather than air by blowing a desiccation gas into the hollow layer of a glass plate at the time of shaping. Moreover, the effect of raising heat insulation property further is also acquired by replacing with the conventional aluminum spacer and considering as the spacer made of resin.

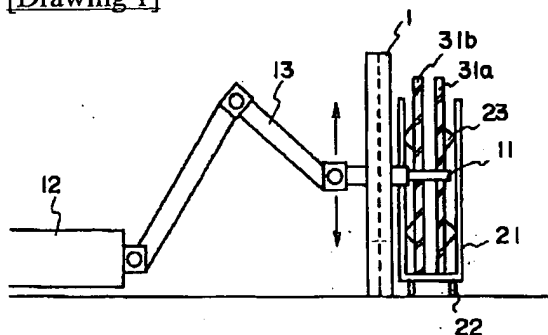
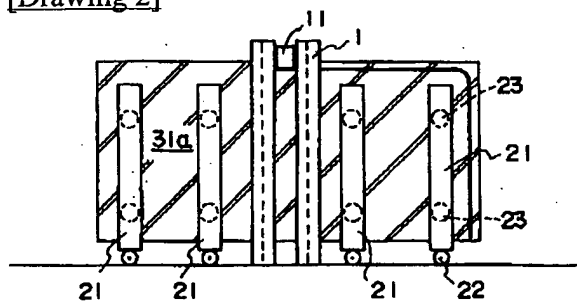
[0041] Extrusion molding of a material can be easily made possible only by applying heat from the thermofusion nature by using thermoplastics as a resin material especially, and a material only solidifies immediately by neglect and thermolysis from the cooling solidification time amount of the material after extrusion molding being short. regimen time amount is unnecessary by this at a multiple glass manufacturing process -- becoming -- regimen space needlessness, short-term delivery correspondence, and handling -- the effect of being easy is also acquired.

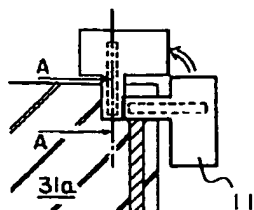
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NOTICES

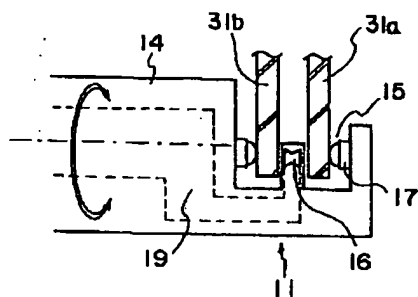
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DRAWINGS[Drawing 1][Drawing 2][Drawing 3]



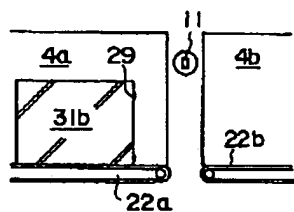
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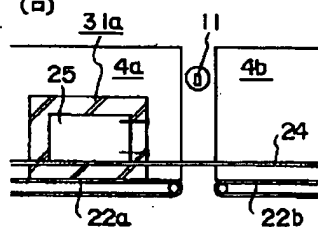
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[Drawing 4]

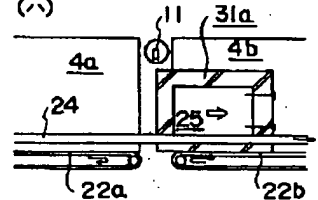
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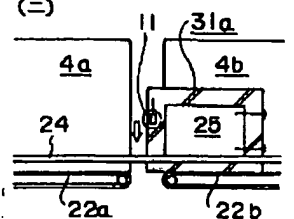
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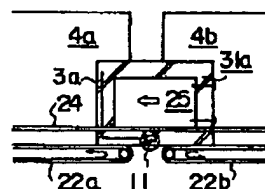
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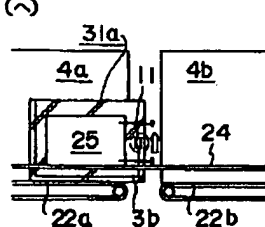
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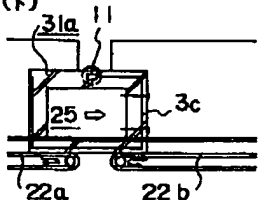
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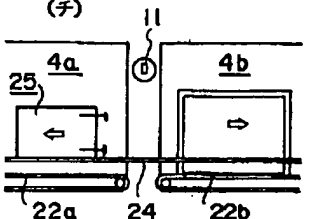
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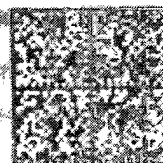
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